System X -- A User Need

William W. Tunnicliffe

I. PROLOGUE

((Mt. Washington from Lakes-of-the Clouds))* It is said of Patagonian storms that "the wind sweeps the land like the broom of God." In Boston we simply call it the Montreal Express! This view of Mt. Washington with the general climate of Labrador--and the highest recorded wind velocity on earth (231 mph before the anemometer blew away'.) --symbolizes a central issue as well as the "nature of the terrain." Shall one look TO the mountain or FROM the mountain.

((Computer Peripherals & Typesetting)) Mr. Phillips in his book has made two statements of interest: one of definition and tentative requirements (Printing....Composition) where he points out that printing is a mass production process applied to individually unique jobs and the phrase "individually unique" is a key point. Another of status (A Printer's Computing Language). The significant point of which is that there has been a lack of definition of the language requirement. The fact that since 1968, when this book came out, this status has changed by degree rather than by kind - or what physicists call a "band jump", is essentially why we are here. Further, it is suggested that implicitly our general span of concern embraces the intellectual, or editorial, pre-processing as well as the physical processes of preparation for printing.

((It Would Take 12 Typesetters, 7 Cameramen, and 13 Paste-up Girls Working on your Company publications, 24 Hours a Day for 8 Days to do what one VideoComp can do in less than 2 hours.)) If the promises of RCA as depicted in the Wall Street Journal and of Harris, Mergenthaler, and other possible output equipment contemporaries are to be fulfilled, it is suggested that what may be required is a new frame of reference. ((A New Frame of Reference)) We're here to discuss the role that composition will play in the business of information dissemination, and more particularly the role that computerized composition may play in that process. And the process, as some of you have already discovered and as others may discover, should they undertake this venture in mild insanity, will involve many things other than simple typesetting.

II. SYSTEM X-----MIND TO MEDIUM

The name of the work that we have undertaken in the Graphic Communications Computer Association has been given as System X because one knows that by far the most controversial, the most soul-searching, and most time-consuming efforts in any system development will be spent on the choice of the proper acronym. We decided to avoid all that.

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* Slides are identified by double parentheses. Those underlined appear as figures and illustrations.

PRINTING . . . . COMPOSITION

Printing is a mass production process applied to individually unique jobs. This leads to a request for computer control that will still retain the versatility of the individual craftsman.

. . . . A. H. Phillips

A PRINTER'S COMPUTING LANGUAGE

There has been some discussion among printers and computer personnel on the need for a special language for printing and the form it should take, but there has been a lack of definition of this requirement.

. . . . A. H. Phillips

((System X)) System X is a conceptual outline from which, it was originally contemplated, a more detailed and more precise set of definitions might be drawn. ((Nelson's Crag to Valley Floor)) As you have by now concluded, *System X is intended as a view FROM the mountain.* ((Total Involvement)) As it is in mountain hiking, to say nothing of climbing, it will require total involvement, by all those who participate.

((TV or not TV? That's not the Question)) Most users accept the CRT as a fait accompli and have less present concern with hardware than with software. ((Tomorrow's Many-Splendored Tune-In)) The approach herein will NOT, therefore, deal with equipment or more remote concepts such as the consumer-oriented "instant-newspaper, or instant-document," but rather with software in a systems sense for less flamboyant but no less important purpose....((Classes of Photocomposition Equipment)) as it might apply to all classes of photocomposition equipment:

A. ELECTROMECHANICAL

1. Matrix
2. Disc
3. Grid

B. ELECTRONIC

1. Cathode-Ray Tube
2. Electron Beam

You are all familiar with hardware considerations. These include both the computer and the various kinds of photocomposition equipment that all have heard a lot of discussions about, and about which one can read in the textbooks. Some examples are John Seybold's "The Market for Computerized Composition," published by GCCA; Victor Strauss' "The Printing Industry" published by the parent organization, the Printing Industries of America----both authors here with us today, and Mr. Phillips' book on "Computer Peripherals & Typesetting", which you have just seen. These are mentioned just to refresh your memories on what there is available for any individual to study, to investigate, and to analyze in terms of his own particular requirements in the way of equipment. Hardware is the easiest thing to concentrate upon.

((Opportunities With Device Operation)) But is is NOT simply to develop opportunities for device operation in the narrow sense, ((Breaking a Language Barrier)) but rather to suggest the establishment of a coherent rationale----to break the yoke of too many languages, too incompletely understood, too difficult to gain entry to----((We build to Specification----and Reduce Processing Waste; Flexibility)) and to suggest that *the language at the process interface be an INPUT LANGUAGE OF IDENTIFICATION AND SPECIFICATION*, both comprehensive and comprehensible.

((Span of Concern)) Our span of concern ranges from manuscript input to photographic-medium output, ((Think Bank)) with content originating in the mind of a creator who thinks in terms of both verbal and visual imagery----and whose thoughts MUST, if one is to succeed, be translated into machine-readable form as early as possible in the process. ((Areas of Concern)) In our thoughts we shall be concerned predominantly with the first four areas on this list:

1. Systems
2. Functional Commands
3. Compiler Requirements
4. Tape Standards

III. THE PRESENT

((The Present)) There is an interpretation of the immediate past history in computerized composition which will be offered to place the matter in perspective.

((The Weapon Called Television)) The weapon, or tool, called television has been largely misunderstood. ((New, New, New, New)) The attractiveness of the medium and the novelty of the approach----in such sharp contrast to the past----have somewhat blinded viewers. ((Those Peerless Princes of Pitch)) Tangibles are far easier to market than abstractions. ((J. Gutenberg at his Press)) And even tangibles have left little discernible mark on conventional processors. ((Two Confidential-Information Heads)) Printers and trade compositors have, in the main, consulted their "usually reliable sources" ((Big Deal)) have drawn a conclusion, ((How to Succeed in Business Without Really Buying")) and adopted a course of action---- which the equipment manufacturers are quite aware of. (("O.K.---- So Impress me!")) Customers, in the main, have adopted a receptive attitude, perhaps best characterized by ((What's All The Noise About?)) "All right, I hear your message----now what's the price per page?"

((Don't Settle For Less Than A Fortune)) Of those intrepid souls who ventured forth, some were aware that they would pay the price of pioneering, some thought they had a guaranteed gold pump. ((Osborn Beast Chasing Man)) Of which-ever calling, each has found a voracious beast whose diet is, in the main, green dollar bills. ((Crazy Sale, Crazy Sale)) This has led, in the main, to what engineers sometimes characterize as "going-out-of-business sales", (("Books Are Dangerous. I Know What I'm Talking About.")) and sagacious observations by those who have experienced the ordeal....all bordering on, (("It Began as a Hobby....And Now It's in the Millions of Dollars,")) or immersed in, economic considerations. ((So Sad)) The recent Research & Engineering Council meeting can only be classified as an exercise in group psycho-therapy----the general tenor of which was worthy of Emmett Kelly. There was a sufficiency of *VENI* and *VIDI* but a positive dearth of *VICI*. Industry's Caesar can fairly be said NOT to have crossed the Rubicon!

It is submitted that the LACK of a suitably simple, yet reasonably comprehensive INPUT language----with related software linkages to whosever program you choose----may be far more of a contributing factor to the NON-USE of already available CRT capacity than is generally assumed, or accepted. ((Life Looks Different in Japan Because It Is.)) In the end, one had best view this whole matter with a certain fatalism, in the manner of the Orient. It IS a different world! To fracture both languages, our Dai Ichii concern (our number one concern) might best be said to be a concerted effort to define and develop such a language. And, in making this suggestion, I am not unmindful of another mountaineering saying: "Innocence is knowing you can and experience is knowing you can't."

IV. THE FUTURE

A. Wares, Laws, and Situational Analysis

((The Future)) What of the future? ((The Wars in Your Future)) Although recently it has been reported that "Apache Tribes Make Wampum Not War," one must sometimes make war before he can make wampum----the war ofachievement, technological achievement. ((One Has To Study The Old To Understand The New----A Japanese Proverb)) How shall we profit from this old Japanese proverb? Study to what end?....To translate from one world to another. ((Before You Start an Automated System, Decide Where It Will All End)) Borrowing from Aristotle's Metaphysics: "Those who wish to succeed must first ask the right preliminary questions" ----and, one might presume to add, these should include: (1) What are the goals? (2) What are the ground rules?

((Multiplicity Of Use)) It is NOT simply the immediately recognizable multiplicities of use:

A. SAME EDITION

1. Data Explosion

B. SUCCESSIVE EDITIONS

1. Data Update

C. ONE-SHOTS

1. Editorial Re-cycling

((Skills of the Hands and Senses Refined by Time)) but rather that the automation must extend capability, in a general sense, NOT merely supplant it.

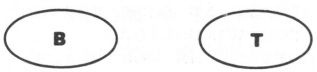
((Business & Technical Systems)) If one looks beyond the hardware into some of the concerns that each will have as he tries this----one's first thought is that the business and technical factors are separate. And indeed they may be from the point of view of the sequence of your looking at them because you certainly have to know what technical things you have in mind before you analyze their costs. But the second and much more lasting thought, after you've gone through this and do a little bit of the arithmetic that relates to costs, is that these two are, as the saying goes, inextricably interrelated----which means you'll have a hard time justifying the cost. And when you get to CRT's you'll undertake a study that might well be entitled, "The Care and Feeding of Furnaces."

((The X Faces of Eve)) We've heard about the Seven Faces of Eve, and one can come up with about six that apply here. The name of this game, of course, is ware----with the w a r e spelling, for the moment. You've heard on previous occasions discussion of software, hardware, and peopleware as being 3 key elements in the creation of any system. The role that content plays, and the form which that content takes, in the eyes of the creator or the publisher assume a far more significant role as one tries to computerize composition than they ever had before. So one should at least recognize that this is an area that needs to be treated in a somewhat different way. The societal implications of this have to do with those existing and future craftsmen who are and will be in the industry that manufactures the document which is to be published. And businessware has to do with the economic glue that will hold this together or cause it to explode. All of which suggests to you that as you go through the calculations, one must beware, if you'll pardon the pun.

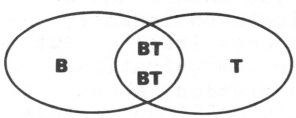
((Communications Within The Communications Industry)) The next slide enumerates both a philosophy and a list dealing with communications within the Communication Industry. It will give you some idea of a new set of roles and missions. There is the publisher who has some reason to produce a given document that reflects some author's opinion, contribution, or findings. On occasion there will be a customer's data processor, not necessarily associated with either the printer or any computer service bureau. There will be implicitly or explicitly a systems analyst who may or may not also be a systems synthesizer. But the process is none-the-less uniquely important to your success. There will be a data processing programmer who has dealt with the content and manipulation of that content but may have very little comprehension of, or desire to comprehend, what must be done in order to compose this in typographic form. There will be a composition programmer. There will be a data input processor. There may be more than one computer processor if you have one for data manipulation and the other for composition. And there will be the composition processor in terms of your photocomposition output device, be it electromechanical or electronic----as in the case of the CRT. There may or may not be a paste-up operation, depending on your success with pagination. There will be the

BUSINESS & TECHNICAL FACTORS

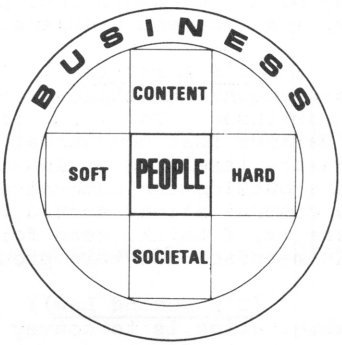
FIRST THOUGHT
SEPARATE



SECOND .... AND LASTING .... THOUGHT
INEXTRICABLY INTERRELATED



THE X FACES OF EVE

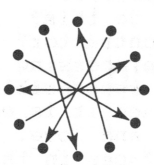


THE VARIOUS "WARES"

COMMUNICATIONS

WITHIN THE COMMUNICATIONS INDUSTRY

1 PUBLISHER
2 CUSTOMER'S DATA PROCESSOR
3 SYSTEMS ANALYST (& SYNTHESIZER)
4 SYSTEMS SYNTHESIZER
5 DATA PROCESSING PROGRAMMER
6 COMPOSITION PROGRAMMER
7 DATA INPUT PROCESSOR
8 COMPUTER PROCESSOR (**S**)
9 COMPOSITION PROCESSOR
10 PASTE-UP
11 PLATEMAKER
12 PRINTING, BINDING

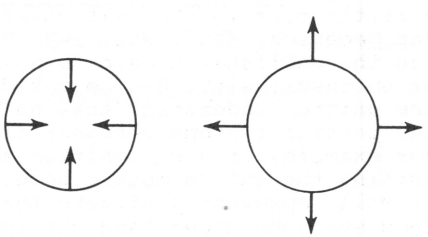


T's FIRST LAW

COMMUNICATION WITHIN
THE COMMUNICATIONS INDUSTRY

IS AT LEAST EQUALLY
AS IMPORTANT AS

COMMUNICATION OUTSIDE
THE COMMUNICATIONS INDUSTRY



platemaker and the printer and binder. Now there are 12. Portraying these as the 12 numerals of the clock, there will be at least one occasion upon which each one of these will want to talk with some one of the other and some of the things that are said are perhaps best expressed by red lines rather than by direct quotation, particularly when it has, shall we say, its inherent problems.

((T's First Law)) This leads to four laws. These are not so much like the laws of Newton as they are like the laws of Parkinson. The first of these is that there is some reason to believe that communications *within* the communications industry itself is at least equally as important as communications outside the communications industry. Many have told us how communications should be used for their human purpose, but there is, I think, need for more discussion within the industry that manufactures this product.

((T's Second Law)) The second is that the purpose of communication is to convey meaning. This you understand and subscribe to I'm sure, outside the communications industry---- the customer side of the communications process itself. But there is the equal need for this within the communications industry, and an understanding that *representation*, about which there is so much discussion, is really only the *vehicle* by which one does in fact convey *meaning*.

((T's Third Law)) The third is that the measure of effectiveness of communication is the *achieved* degree of understanding. Not: Is the system itself perfect? But rather: Are the users benefiting from it? There is a current illustration of this which you can look upon as something which is on the table. In New Orleans, or even Washington, it might be sodium chloride; in Helsinki it might be Strategic Arms Limitation Talks.

((T's Fourth Law)) The last of the four is that the greater the number of interfaces, and this is within the manufacturing process itself, the greater the *need for specification*. And the equation suggests that this need is geometric. You can call it ground rules, common sense, what have you. There must be understanding if there is to be a smooth flow in the production process.

((Business - Technical Who's Who)) If we pursue this a little more in the next chart, we will have our own Business and Technical Who's Who. Who has general systems responsibility? Has the publisher chosen to assume this role himself? Consciously or unconsciously? Has he asked the printer to do this? Does the printer understand that he's the general contractor? Who has partial systems responsibility for a data processing segment, for example, or a composition segment? Who is responsible for putting the entire mosaic together? So that when it is completed it will represent a picture that you will know and love. And does everyone understand the role of the interfaces in this

T's SECOND LAW

THE **PURPOSE** OF COMMUNICATION IS
TO CONVEY MEANING

REPRESENTATION IS ONLY
THE VEHICLE

T's THIRD LAW

THE **MEASURE-OF-EFFECTIVENESS**
OF COMMUNICATION

IS THE

ACHIEVED DEGREE OF UNDERSTANDING

SALT

T's FOURTH LAW

THE GREATER THE NUMBER
OF **INTERFACES**

THE GREATER THE NEED
FOR **SPECIFICATION**

$$S = (I)^n$$

BUSINESS – TECHNICAL
WHO'S WHO

WHO HAS:

GENERAL SYSTEMS RESPONSIBILITY ?

PARTIAL SYSTEMS RESPONSIBILITY ?

SYSTEMS INTEGRATION RESPONSIBILITY ?

INTERFACE UNDERSTANDING ?

process----in addition to understanding the over-all process itself? ((Yesterday/Today)) Paraphrasing again with regard to some well-known sayings to which engineers may have been more exposed than others, since they are known to be irreverent by nature:----It used to be: Yesterday we didn't even know what an engineer were; today we are one! Of course, the okay word of today is interface. So, if you are in this process---- you will know what it is to be an interface instead of to hear about one.

((End-Product Design/Analysis)) The end-product is the goal in every one of these processes. Whether you consider this to be a design approach or an analysis approach, the choice is not really significant in the sense that you can use what we are to discuss from either point of view. It is perhaps more conventionally looked at from the point of view of analysis because the given products have been existing printed products which one is trying to duplicate or to change in some describable manner. One way of looking at this is what might be called *situational analysis*. In the broad sense you can have what are structured numerical documents such as number tables, rate charts, things of that kind; structured linguistics; straight text, such as a book; illustrations within the text. And then there is the matter of form. Will this be a printed product? Will it be a microform product? Or will it be prepared for, say, facsimile transmission? Within the fine structure of this there will be the matter of headings. What kind, how many different kinds? What kind of text in the body? What kind of text in the insets? What will the running heads be? And the ever-present matter of the 50-page book that is more difficult to program than the 40,000-page volume should not be forgotten!

B. Diversity of Product and Manufactured Form

((Product Diversity)) Many and diverse are the FORMS of communication which a system should accommodate. ((Chart Page Assembly Exhibit, Overlay Rolled Back)) While one steps beyond the physical form of photographic overlays and chain-printer pages, the concept of interlacing of data----fixed and variable----is an explicit requirement. ((Chart Page Assembly Exhibit, Overlay Flat)) (("War and Peace" in Less Than an Hour)) While one thinks beyond ILLUSTRATIVE COMPUTATION of "War and Peace" in less than an hour, ((The Long Short Cut)) or ILLUSTRATIVE ACHIEVEMENT, novels and other straight-text matter must be accommodated.

The following are examples which illustrate structured numerics, structured linguistics, straight text, and so forth, leading to transmitted images----a portion of the spectrum of desired accomplishment. ((USGPO: Job Size Approx. 36,000 Pages, Reversal Film and Printed Page)) As you all will recall, this was the first job which Jack Boyle put through the GPO. It was a nice 36,000-page job which made the propriety of his approach quite apparent. A reversal film leads to a plate and to a printed page such as is illustrated. The use is for a structured

YESTERDAY

WE DIDN'T KNOW

WHAT AN INTERFACE WERE!

TODAY

WE ARE ONE!

END-PRODUCT DESIGN/ANALYSIS

SITUATIONAL ANALYSIS:

BROAD

STRUCTURED NUMERICS
STRUCTURED LINGUISTICS
STRAIGHT TEXT
ILLUSTRATIONS
FORM ---- MICRO
FAX
EBR

FINE

HEADINGS	x	TYPES/KINDS
TEXT	y	TYPES/
PERIPHERAL TYPOGRAPHY	z	TYPES/

NUMBER & KIND vs PAGE VOLUME

numerical or structured alphanumerical type of document. ((Staten Island Telephone Directory Page)) This one, of course, represents Frank Weis' Staten Island Directory, the first large directory experiment in which telephone entries were made----the structured linguistic example, the PHOTAC predecessor to today's Project DIR/ECT. ((Later Telephone Directory Page)) ((Later Telephone Directory Page)) The last two are more recent samples as this work progresses.

((PART Survival and Unification----RCA Text Sample)) ((Chapter 11 THE FIRST PUNIC WAR----RCA Text Sample)) These are some early examples of straight text. ((COMPOSITION VARIANTS The NY Times Large-Type Weekly----Large-Type Books)) This illustrates variants in composition that you could acquire from the same original keyboarded input and which people who have poor eye-sight do, in fact, use and enjoy. ((Text)) This next series is a representation of RCA's combined text and illustration technique, which is now available in their equipment, showing the text, ((Image)) the illustration, ((Text and Image)) the two combining to make one image. ((RCA VIDEOCOMP 840 Flow Diagram)) and in this flow chart in the upper right, the microform which can be made in the same way----((Text and Image and Microform)) more clearly shown in this diagram. And any system must take advantage of this capability.

V. SYSTEM CONSIDERATIONS

A. Philosophy and Broad Concept

((System Considerations)) In the area of system considerations, ((Philosophical Environment)) the guidelines selected should be flexible and responsive to defined need. Reading from the text, one identifies the elements of policy and implementation.

((System Broad Concept)) If we step into what are the broad concepts of System X, in simplified form there are creation, copy handling, a typographic determination which has been separated out from the inputting process, a typographic implementation, and a proofing loop which has 2 roles: one for the content and the other for the typography. The key factor in here is that you can change your mind about the typography because there are separate inputs, as you will see, where you can change what you have selected as body text or what you have selected as the font for the heading of the first kind. When you have made up your mind that you have what you want, then you can put this out to printing and binding. You can go around this loop as few or as many times as you desire. ((System Implementation)) This is a one for one of implementation which shows the use of both high-speed and low-speed photocomposition lines because there will inevitably be front matter which you may choose to do by hand as contrasted to the major part of the text which you might like to do by machine.

4. PHILOSOPHICAL ENVIRONMENT

A. GUIDELINES

1. Policy

A standard interface should be created between customer and printer which:

a. Is NOT complex

b. Is NOT a function of what over-all typographical specification set may be selected

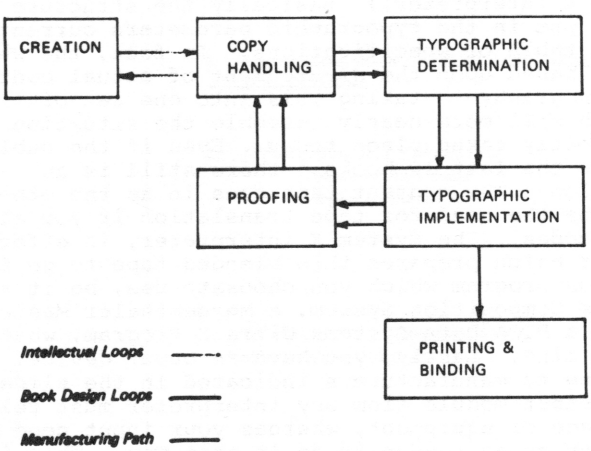
c. ALLOWS the customer to provide
   a. machine-readable copy,
   b. manuscript copy, or
   c. combinations including both

2. Implementation

An OPEN-ENDED language should be created which will allow simple addition of later items in the intellectual/editorial and typographic situation catalogs.

SYSTEM

BROAD CONCEPT



Typography is still a variable at this point

B. Over-all Structure

((Categories of Consideration)) The whole viewpoint of our discussion today is what you might call a *top-down view* based on what you want as an end product and how the whole process can be put together as a system. Recognition that in the methodology of communication as evidenced in the manufacturing process there will be *editorial situations and typographic situations.* And the suggestion that a problem-oriented language with a sufficiently high level of abstraction is desirable. What this means is: the level of abstraction that you would like is one which establishes the maximum degree of ease for those doing the input keyboarding. Do they have to deal with long strings of function codes, or do they have to deal with short strings of function codes? They inevitably must key in the content; so that's not a matter for discussion. It has only to do with the manner in which you set up the system to structure it for manufacturing execution.

((Mode of Communication)) The basic premise is to relate this to the editorial structure of the document and to use typography to strengthen those measures of emphasis which the publisher would like to have, subject again and always to logical conditions. The over-all purpose is to insure that the publisher has at his disposal, and exercises, those *means of changing communication mode* which he desires. And he desires this because that's his *method of conveying meaning.*

((Content Stream--1)) The content stream must include the basic content and what have been called *change-of-mode identifiers.* These may relate to the editorial structure and they may relate to typography when typography is a measure of emphasis in the communication process. It does not mean typography in what you might call a housekeeping or regular sense.

((System X Interpreter)) Basically the structure of this approach is to put in the typographic parameters currently in effect through a table of specifications. In fact, the whole approach to this is based upon the *divorcement* of actual content keyboarding from typography----taking this into one set of specifications which will more nearly resemble the situation which implicitly or explicitly takes place today. Even if the publisher says: "Make it like the last 10 books," there still is an implicit specification. The content tape goes in as the other input. There will be the need for tape translation if you allow generality in tape codes. The System X interpreter, in effect, is a pre-conditioner which prepares this blended tape to go into any given composition program which you chooseto use, be it an RCA PAGE 1, a Harris Composition System, a Mergenthaler Master Typography Program, a PICA Data Systems Ultra-X Program, whatever program you have in mind. Lastly, you have an ouput device. The variability according to manufacturers indicated in the slide would suggest that your output module from any interpreter must relate to some specific piece of equipment, whereas your input need not. And there is, I think,great reason to do it that way. This is, in fact, the "*whole point*."

CATEGORIES OF CONSIDERATION

TOP-DOWN VIEW OF THE SYSTEM
The Manufactured Product

METHODOLOGY OF COMMUNICATION
Editorial Situations
Typographic Situations

PROBLEM-ORIENTED LANGUAGE
Level of abstraction sufficiently high

MODE OF COMMUNICATION

Relates to:

1. Position within the *INTELLECTUAL HIERARCHY* of the *CONTENT*

2. *TYPOGRAPHICALLY EFFECTED*
   - measures of emphasis
   - logical conditions

Purpose:

To insure *PROPER COMMUNICATION* of *INTENDED MEANING*

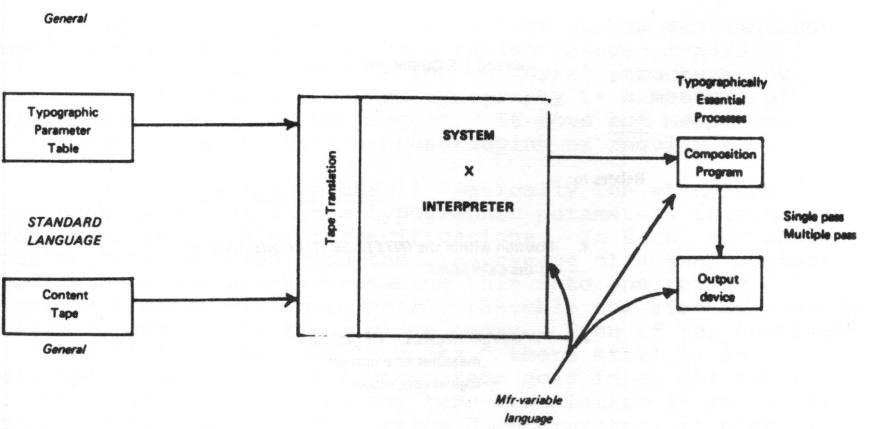
CONTENT STREAM

Must include:

BASIC CONTENT

CHANGE-OF-MODE IDENTIFIERS

- Hierarchical
- Typographic

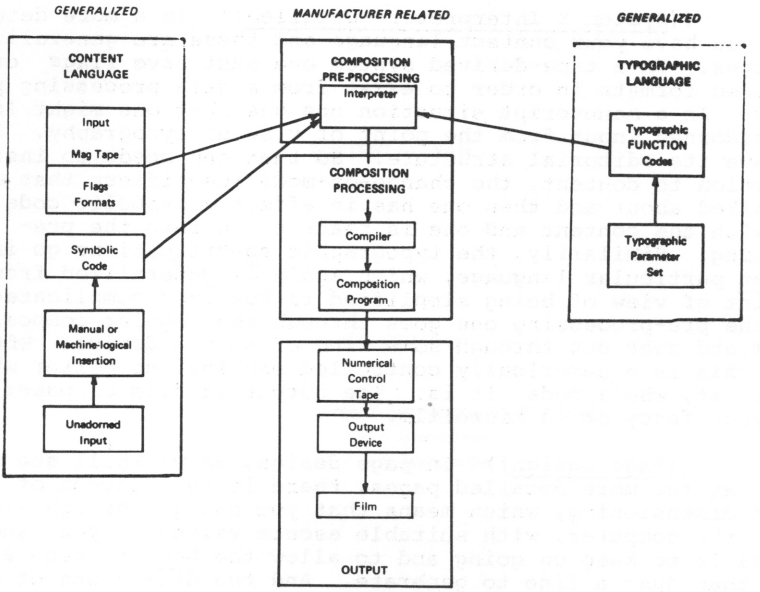


((System X Interpreter--Detailed)) In a more detailed sense, you have your content language and these are generalized structures. In a tape-derived system one must have flags or structured formats in order to exist from a data processing point of view In a manuscript situation one has what one might loosely call unadorned input from the point of view of typography. It does have its editorial structure. So that one needs to insert, in addition to content, the change-of-mode identifiers that we have talked about and then one has in effect a symbolic code mixed with the content and one is ready to go into the pre-processing. Similarily, the typographic specifications go in in that particular language, which again is generalized from the point of view of being simplified rather than complicated. After the pre-processing one goes through the regular composition program and goes out through some kind of output device. Effectively, this is a numerically controlled machine, no matter what you call it, who's model it is. The output is film or paper as suits your fancy or in microfilm.

((Page Design)) In page design, as we shall see when we look at the more detailed pages, there is the concept of dynamic dimensioning, which means that you can go through a whole book in the computer, with suitable escape valves if you hang, but the idea is to keep on going and to allow the book to generate rather than just a line to generate. And the dimensions of each class of text considered from an editorial point of view are independent. They are not interrelated in the logic of typographic implementation although they may be in the aesthetics of typographic design.

((Dimensioning)) Dimensioning is approached from the point of view that the horizontal dimensions are structured according to class and the vertical dimensions have to do basically with the print zone----all with such other constraints as you impose regarding the interrelationship of different classes e.g., a heading to its body text.

((Typographic Parameter Table)) The Typographic Parameter Table specifies what the basic parameters are for any given class. Here illustrated are Classes 1 to 6, the measure varying in this particular case not at all, each being 24 picas wide, and a given set of faces and of related factors which do vary----the usual things that you see with regard to the specification of parameters for given portions of the text. This does not deal with the conditional-logic elements which we shall get into. What this allows you to do is to put in a content stream which has simplified coding which will,by the pre-processing, be itself exploded. You've heard much of data explosion with regard to the use of magnetic-tape-stored data which is used in 4 or 5 different ways. This is the function-code explosion. This was the kind of page that was looked at in the course of this particular example, taken from our discussions in Maryland.



PAGE DESIGN

DYNAMIC DIMENSIONING

CLASS DIMENSIONS INDEPENDENT

DIMENSIONING

1. HORIZONTAL DIMENSIONS
   - *Structured*
     - content class
     - special typographic vehicle

2. VERTICAL DIMENSIONS
   - *Physical Constraints*
     - allowable zones
   - *Communications Mode Constraints*
     - logical rules imposed by
       - (1) class
       - (2) class relationship
       - (3) special typographic vehicle

TYPOGRAPHIC PARAMETER TABLE

	Units	C1	C2	C3	C4	C5	C6
Measure	Picas	24	24	24	24	24	24
Face	Code Table	5	5	5	6	5	9
Size	Points	10	24	8	8	8	10
) Primary	Points	0	0	0	0	0	10
Indention) (Para. 1st line)							
) Secondary	Points	0	0	0	0	0	0
Word Space Max.	Points	5	8	4	4	4	6
Word Space Min.	Points	5	8	4	4	4	4
Line Mode	Code	FL	FL	FL	FL	FL	HJ
Pre-Text Space	Points	20	38	28	9	14	28
Baseline to baseline within the class	Points	10	28	9	9	9	11

((Content Stream--2)) This example illustrates minimal coding which is related to the editorial hierachy and to typographic emphasis. For example, the (13) is an identification of job and operator; the (7) indicates non-justifiable horizontal space; and the (3) indicates a forced short-line break. ((Chapter 2 Problems of Computer Typesetting----page image)) This coding leads, via programs, to the finished page image----a page sample selected from Professor Duncan's session at the London Conference.

C. Functional Capabilities

1. General

((Functional Capabilities)) As to functional capabilities, ((Context)) let us look at this from the point of view of context, editorial and typographic. You have seen these described as individual elements, and there is a combination which is both editorial and typographic where the interrelationship of the basic content (the data of the data base), whether it be a manuscript or some other form, and the content entry in terms of typography have this relationship with regard to the physical expression in the image. You will later see in a sample directory that the simple example of this is the telltale. You don't know what the first entry and last entry are until the process has in fact taken place.

((Fundamental Decisions)) The fundamental decisions that you have to make as a potential practitioner are to select programming solutions which will be either particularized or generalized or perhaps some halfway house in between. And therein will hang some large dollar bills. There is not to my knowledge extant today any completely generalized system and this is the reason for pursuing the vision of System X. There are many particularized solutions. You can do a particular book in repetitive editions. You can pay for the programming to have that done and that will be less expensive than a generalized solution, but you won't be able to use it for anything else. A lot will hinge upon your approach to pagination---- do you want to do this manually with paste-up or do you want to have it flow-generated in the machine, the latter, of course, being clearly more expensive, if the generalized capability does not exist.

Two slides illustrate types of composition which are inherent in your consideration of how much you want to put into the computer. The first one ((Line Composition)) on line composition is, of course, the line-by-line generation, which many of these machines, with the exception of the 1010, really provide. They are all line-casters with the exception of the 1010 and the RCA window feature. But there is a big difference in how your thought processes go. It may put down line-for-line, but are you going to do anything else besides line-for-line casting.

CONTENT STREAM

```
(13;C1)SCHAPTER(7)U2
       H          N

(C2)SPUROBLEMS(3)OFWSCUOMPUTERWSTUYPESETTING
    H N            SH N        SH N

(C3)SCUHAIRMAN

(C4)SMURWSCWJWDUUNCAN
    H N SH S S N

(C3)SSUPEAKERS
    H N

(C4)SMURWSRWFWFUULLICK
    H N SH S S N

    ..

    ..

    ..

    ..

(C4)SMURWSHWGWMUILNER
    H N SH S S N

(C6)SCHAIRMAN:(7)SWUEWAREWGOINGW  ....
    H            H N S   S     S
```

CHAPTER 2

Problems of Computer Typesetting

Chairman
Mr C J Duncan

Speakers
Mr R F Fullick
Mr R Boyd
Mr D Macintyre
Mr E J Coates
Mr J M Johnston
Mr H G Maner

CHAIRMAN: We are going to start, first of all, on books and solid text. I have a vested interest in this but I am not going to say anything until I have another go at you tomorrow.

The first speaker is going to be Mr. Fullick. You will have read his autobiography in the conference booklet so I do not propose to do anything more than to introduce him to you and ask him to open the proceedings.

Problems of a book printer

Mr. R. F. FULLICK (Hazell Sun Ltd): In this two and a half days of theory and typographical philosophy upon which we have embarked, I at least feel myself fortunate in being able to state an incontrovertible fact: that is, it is extremely difficult for any speaker to follow Mr. Duncan!

One does not have to be long involved in computer typesetting to realize that it is somewhat like climbing a hill; when one thinks one has got to the top, one realizes that it is just a false crest, and all it does is to reveal another uphill area in front of one. This is certainly how I have felt in the year or so during which I have been engaged in this.

In this period, when interest in computer typesetting has been growing, there have been points of view put forward questioning the need or desirability of this line of technological research in the printing industry. Fears have been expressed for the position and future of those people who make up the industry, in all its diversity, whether they be master printers or workpeople.

CONTEXT

EDITORIAL

TYPOGRAPHIC

EDITORIAL/TYPOGRAPHIC

THE INTERRELATIONSHIP OF

BASIC CONTENT (DATA)

AND **CONTENT ENTRY (TYPOGRAPHY)**

FOR ANY ONE LINE

FUNDAMENTAL DECISIONS

BUSINESS & TECHNICAL

PROGRAMMING SOLUTIONS

- PARTICULARIZED
- GENERALIZED

PAGINATION

- MANUAL — PASTE-UP
- MACHINE — FLOW-GENERATED

INPUT FLAGS

CHANGE OF:

- **STATE**
- **COMMUNICATIONS MODE**

INPUT FLAGS

GENERIC — **UNIQUE** —— TO A GIVEN JOB

- SHIFT
- UNSHIFT
- WORD SPACE
- END OF PARAGRAPH

SELECTIVE EMPHASIS

- BOLD
- ITALIC
- UNDERSCORE
- CHANGE OF POINT SIZE
- SPECIFIABLE LATER

DELIMITERS

DO-NOT-BREAK

- PHRASE
- LINE
- TEXT BLOCK

That's the clear question----in the manufacturing process. ((Area Composition)) In the 1010 for example, or in the window of the RCA, if you wanted to interlace the structure of a table, which might be repetitive from edition to edition, and newly generated numerical data, here illustrated within the frame, you could do this all without any page movement. In the other machines and in these you would have to have accommodated this in your program. *There is no escape from symbolic manipulation before photographic exposure.*

((Confessions of an Ex-Stripper)) Just what should a program do? Here are the razor and rule which symbolize the process. And however you do this, you have certain constituent elements which you use as the basic ingredients of what one might call the mosaic: running heads and feet, some ads, and the basic content. This slide represents ((Full Page)) a drug-directory page that you want to generate. You start putting things on ((8-Slide Paste-Up Series)) and the page builds before your eyes. And hopefully doesn't go down in flames. Then when you're all done and you know what the first and last entries are you can put in the telltales, and you have your completed page. That is really what you have to do, whether you do it manually or by machine.

2. Input

((Input Flags)) The input flags you will want to utilize in order to identify what you might call changes-of-state, what have been called in here *changes-of-communication-mode*. These really are the decision of the publisher, or the author, in the course of his process of determining how he wants to convey meaning. And the role of the printer or the typographer is to give *imagery* to his selection.

((Input Flags--Detailed)) If we look at what these are in a little more detail, there will be certain generic codes that you will need in any job. And this is oriented towards the book text, because it's easier to discuss from that point of view. You will need a shift code, an unshift code, a word space, an end-of-paragraph, for example. For selective emphasis you can indicate that you want bold. You won't know what bold it is at this point in time. You will specify that separately, or call upon others to specify it separately, but it will be a bold that is related to that particular class of text in which this input flag appears. And this is really the whole name of the game. You're specifying what you want as a device for emphasis, but you are not specifying an exact manufacturing technique. You're doing that separately. You might choose to italicize, to underscore, to change the point size, or say, "I haven't made my mind up, but I just know that I want to do something here and I'll come back and tell you some sunny day." But you do have to have the point identified and that is really all that is required. You will need delimiters and it doesn't matter whether you're thinking of RCA's left-and right-hand delimiters or Textran's @ sign and a comma, or anything else of anyone else's choosing. They must exist; they must be unique; they must never be used in content, unless you put in

structure variants. You will also in some cases want some do-not-break instructions in here, which in essence have to do with your train of thought but in reality will specify as "don't break this phrase," or "don't break this line," or "don't break this text block." And, in the illustration case, "don't put half my illustration in one column and half in the other, or on another page."

((Input Delimiters)) The next chart will suggest to you that you can draw up a long list, even expressed generically, which gives you all the more reason to do it generically than specifically You will see these same things identified as the running state changes; e.g., the selective emphasis items or forced end-of-page. We talked about do-not-break. There are occasions when you want a forced short-line-break, as you saw in the previous content stream And this isn't because the typographer wants it this way necessarily It's because the author or the publisher wants it this way as a *vehicle for communication.* So the system that is created must respond to that need and this is, therefore, generically required. Note also, such logical requirements as the two kinds of "call" ----typographic and intellectual.

((Input Text Stream)) In the next one, this is an input text stream similar to the one you saw in a preceding slide. It re-emphasizes the point that you will minimize the amount of input keyboarding, that you will be able to use this same input tape to exercise different kinds of typography without ever changing the input tape itself. You will only change the specification of typographic parameters or logical conditions.

3. Meaning and Representation

((Codes and Structures)) You will by now have concluded that the thrust of these remarks has to do with *structure;* that, in this coding, the significant thing is the structure; that you must be consistent within the action definition which you apply to any particular code. You have the issue of meaning vs. representation and the emphasis is on consistency of meaning, a simplification we have touched upon, and the fact that, by different choices of parameters in the parameter table when one goes through the pre-processer he can exercise typographic flexibility or design change without re-keyboarding. To concentrate on this issue of meaning and representation there are two slides. This is what people often think about when they think about standardizing codes. ((Bell Laboratories 5-Level Code)) The first is a Bell code, and ((Linofilm 15-Level Code)) this is a Linofilm code. ((Meaning & Representation--1)) But the really significant thing is that you want to convey meaning. *It's the fact that it's an A that's important.* As far as bit configuration is concerned, what should it be, it would be easier if there were a worldwide standard, there can be absolutely no doubt about that, but for the purposes of a system which must respond to the facts of life and the needs of the publisher, the significant thing is that the code should be known. In this circumstance that we're describing, the publisher might do his

COMPOSITION SYSTEM WORK SESSION NO. 2
W. W. TUNNICLIFFE, CHAIRMAN

INPUT DELIMITERS

A. Predominantly content related with identification of changes of typographic state

1. Initial typographic parameter set

2. Change typographic parameter set

   a. Running-state change
      (Content is not necessarily contiguously related in magazine work)
   b. Selective emphasis
      (1) Bold
      (2) Italic
      (3) Underscore
      (4) Change point size
      (5) Specifiable
      (6) Generic code

3. Forced short-line break (mandatory phrase break)

4. Forced end of page
   (Both content-related and typography-related in the sense of a revision zone, which must match to preceding and following editorial content and must match to preceding and following typographic structure.)

5. Illustration call

   a. Call
      (Typographically-related call; NOT the reader's call that appears in the normal text)
   b. Store of illustration characteristics
   c. Store caption text

6. Non-justifiable vertical space

   a. Use/not use per page position

7. Non-justifiable horizontal space

COMPOSITION SYSTEM WORK SESSION NO. 2
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INPUT TEXT STREAM

(13;C1)$^{S}_{H}$CHAPTER(7)$^{U}_{S}$1

(C2)$^{S}_{H}$I$^{U}_{S}$NTRODUCTORY$^{WS}_{SH}$S$^{U}_{S}$ESSION

(C2)$^{S}_{H}$P$^{U}_{S}$ROBLEMS(3)OF$^{WS}_{SH}$C$^{U}_{S}$OMPUTERIZED$^{WS}_{SH}$T$^{U}_{S}$YPESETTING

(C3)$^{S}_{H}$C$^{U}_{S}$HAIRMAN

(C4)$^{S}_{H}$M$^{U}_{S}$R$^{WS}_{SH}$C$^{W}_{S}$S$^{W}_{S}$A$^{U}_{S}$LLEN

(C3)$^{S}_{H}$S$^{U}_{S}$PEAKERS

(C4)$^{S}_{H}$M$^{U}_{S}$R$^{WS}_{SH}$C$^{W}_{S}$J$^{W}_{S}$D$^{U}_{S}$UNCAN(3)

(C4)$^{S}_{H}$D$^{U}_{S}$R$^{WS}_{SH}$D$^{W}_{S}$G$^{W}_{S}$B$^{W}_{S}$E$^{U}_{S}$DWARDS

CODES & STRUCTURES

THE STRUCTURE IS THE THING

....CONSISTENCY OF
ACTION DEFINITION

MEANING vs. REPRESENTATION

SIMPLIFIED ....at input

VARIABLE INTERPRETATION ALLOWS:

TYPOGRAPHIC FLEXIBILITY
DESIGN CHANGE
....**without** re-Keyboarding

MEANING & REPRESENTATION 1

BIT CONFIGURATION

A

WHAT SHOULD IT BE?

KNOWN
CONSISTENT
at least for one job

MEANING & REPRESENTATION 2

STANDARDS OF MEANING

CONTENT & **COMMUNICATIONS EMPHASIS**

RICE

TYPOGRAPHIC IMPLEMENTATION STRUCTURE

SYSTEM X

USE

ASCII } INFORMATION INTERCHANGE
RICE }

SYMBOLIC REPRESENTATION OF
CONTENT
EMPHASIS

SYSTEM X INFORMATION INTERCHANGE

SYMBOLIC REPRESENTATION OF
CONTENT
IMAGERY

BOTH are INTERFACE LANGUAGES

own keyboarding. He might have it done by a third party. The printer might do it. You could be faced with getting some input in which you don't know the codes. So, clearly, that's one of the first things that you have. The second thing is that it must be consistent, at least for that one job. And that's the reason for the tape translator at the head end of the block diagram. You don't really care if it varies from job to job. But an A must be an A throughout this particular job, or job segment. And the work that Dr. Duncan is doing in standardizing may make this all a little more tractable for you.

((Meaning & Representation--2)) As to standards---- *the standards must be those of meaning.* Many of you may have read the article by Mr. Rice in the Journal of Typographic Research. His article has to do with content and what I call communications emphasis. And I think it is generally consistent with the approach of System X in that System X concentrates on typographic implementation of the publisher's desires----*releases selected imagery.* The publisher's desires really are those that are expressed in this input tape. And Mr. Rice's approach, it seems to me, is a vehicle for specifying what he desires and not so much the interpretation of this into practical----I won't say practical but rather----into physical form, physical images. ((Engineer and Manager----each with a different airplane in his mind's eye, and text: What managers cannot understand they usually will not approve----and what they do not approve the engineer cannot accomplish.)) If you wonder why I concentrate so much on meaning, this will give you a clue. Since it may not be readable, I will read it: "What managers cannot understand they usually will not approve. And what they do not approve the engineer cannot accomplish." This truism is pervasive in this whole process, not only in the economic justification.

((Use)) Let us look at the use within these two areas that we have been touching upon. In the case of ASCII or Mr. Rice's article, each deals with information interchange in which the symbolic representation refers to content and to emphasis. System X, if you like, is information interchange also. It is the symbolic representation of content and selected imagery. Both of these, in essence, are *interface languages.* They are intended to go between processes at the very least and in some likelihood between people or different companies, as the case may be. If there is consistency and standardization of meaning, then these will go forth.

4. Paging

((Page Geometry)) In the area of page geometry---- these are intended to be one-time graphically oriented definitions of what the total print area should be and of what the subordinate print areas may be, where you want your rules----in a cartesian mode of expression of source and destination. They constitute in essence the total allowable set of areas in which you may cast type of any kind. They may never all be used simultaneously on one page, but each will have been used at least once in the course of the whole document.

PAGE GEOMETRY

ONE-TIME, GRAPHIC DEFINITIONS OF:

TOTAL PRINT AREA

SUBORDINATE PRINT AREAS

RULES / CARTESIAN

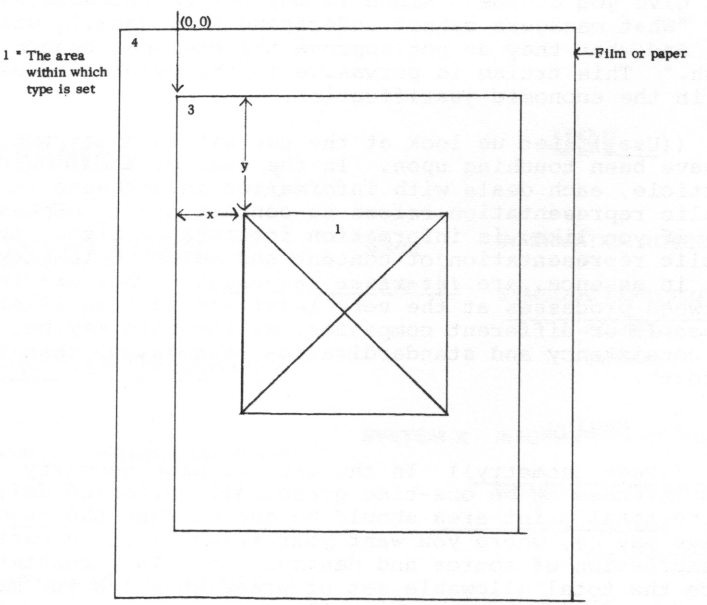
THE TOTAL ALLOWABLE SET

GRAPHIC COMMUNICATIONS Computer ASSOCIATION of PRINTING INDUSTRIES OF AMERICA, INC.

SHEET 35

COMPOSITION SYSTEM WORK SESSION NO. 2
W. W. TUNNICLIFFE, CHAIRMAN

BASIC DIMENSIONING



PAGE COMPOSITION FACTORS

1. Basic dimensioning
2. Alternating page design (yes/no)

((Basic Dimensioning---1)) If we look at what this means in somewhat greater detail in the next series of charts, there are the conventional factors of page dimensioning, in terms of what does the publisher want in terms of the over-all print area on the page. Then there are the more mechanical and more detailed steps which you must take in specification as illustrated in the following charts. ((Right Page Design)) This illustrates, for example, where Class 1 text may fall and think again of the London proceedings on typesetting; where Class 2 text may fall; and where Class 3 text may fall. And so forth. They cannot fall in any other pattern. For example, C4 text could never fall to the left or the right of that indicated area. And the message of these diagrams ((Page Layout Sheet 36)) is that everything must be specified if everything is to be processed automatically. *There is no escape from specification.* ((Basic Dimensioning--2)) This slide begins to suggest the first step in what you might call the *dynamic dimensioning* with a running dimensioning where the emphasis of these classes has been on horizontal. And now you begin to see this suggestion of the form that it's going to be running through; where a left-hand page will float; where a right-hand page will float; both with respect to the running edge of the paper, going through the composition device itself. ((Typographic Parameters)) This slide illustrates the source/destination specification of rules as a part of this whole business of page-dimensioning and class-of-text specification. You will want to have it set up in essence so that for an allowable page structure you can specify the source, destination, and weight of any particular rule that you want to generate. And you don't really want to concern yourself with anything else.

5. Typographic Parameters

((Entries in Typographic Parameter Table)) The next one is the parameter table that you have seen illustrated previously, where in essence you would start with a structured piece of paper and you would fill in the numbers. This would constitute the *decision of specification* that you as a publisher, or you as a printer, or you as a new-breed processor would make if the publisher asked you to do this for him.

6. Explosions

((Explosions, Kinds of)) There have been several kinds of explosions, discussed and in fact. The ones that we're concerned with are those that deal with data and function codes. The data you are quite familiar with in terms of multiplicity of use----everything from the Electronic Buyer's Guide on down. The function-code explosion is a technique that is used in part by some of the programs that are available today and is inherent in the whole process that is projected for System X.

((Runs)) The purpose of these explosions is to allow you to make runs to do the work instead of having people do the work in the sense of accuracy, minimizing, in fact eliminating, the proofreading requirement, in the character-for-character sense. In the cases of straight-text and structured-data, both

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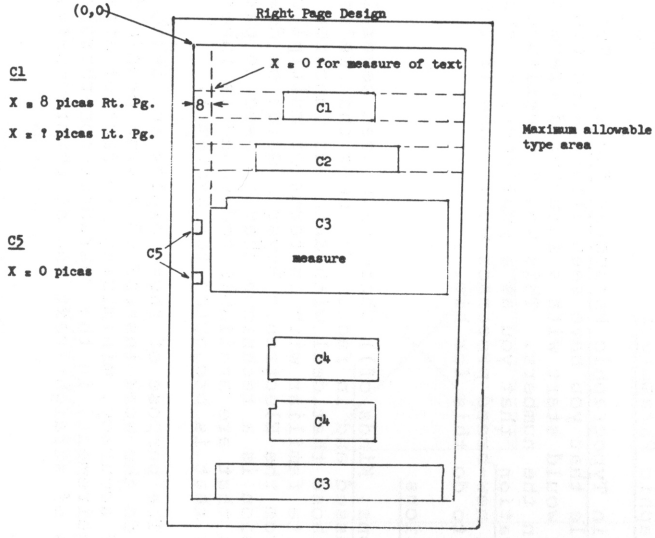


Page Characteristics

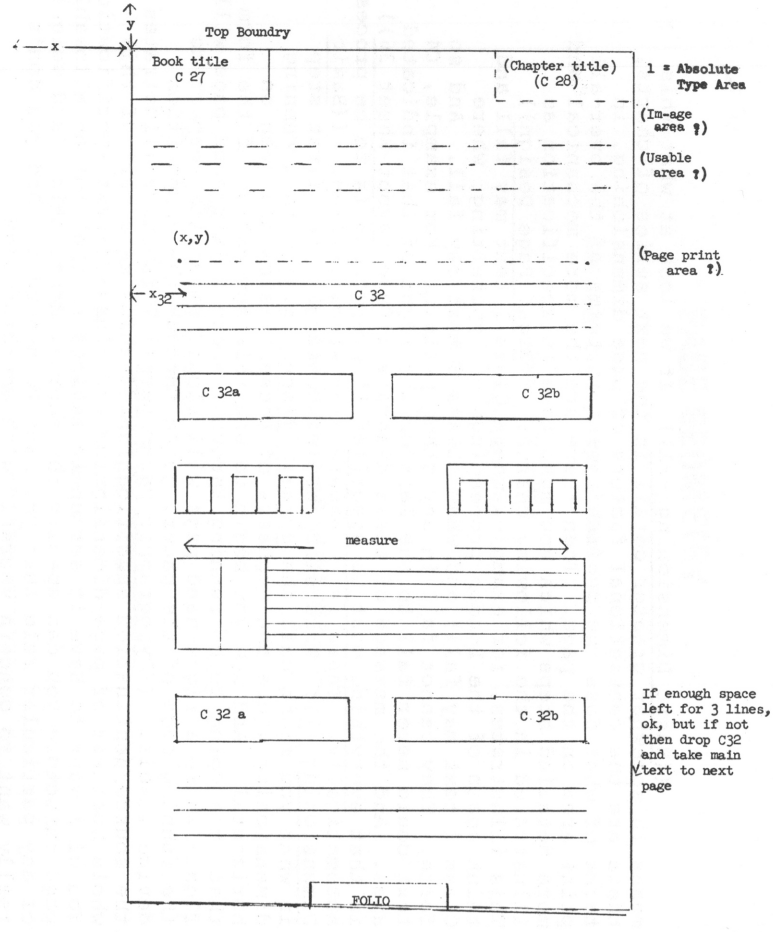
	XL	XR	Y start	Y stop
C1			Could require separate entry for each page column	
C2				
C3				
C4				
C5				

Are all alike except folios, running heads, running feet?

Characteristics page related:
- Page Structure
- Book Structure

Characteristics "C" related:
- Area Structure
- Line Structure

COMPOSITION SYSTEM WORK SESSION NO. 2



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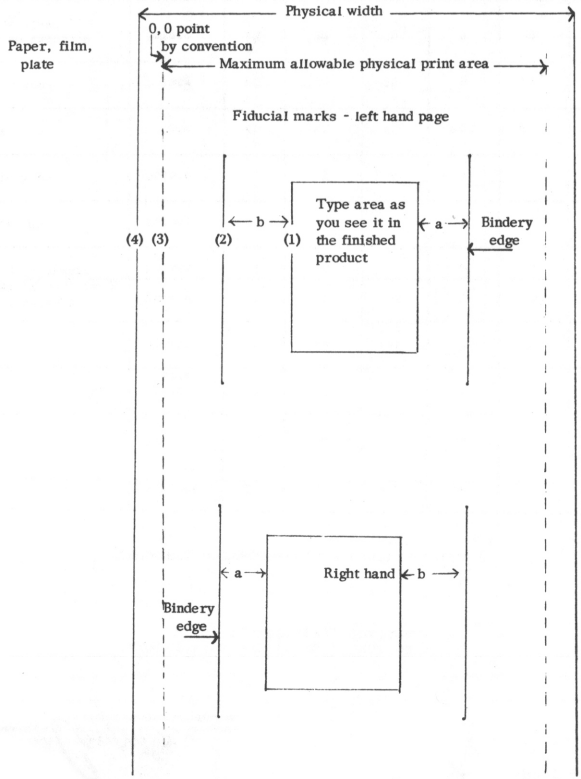
BASIC DIMENSIONING



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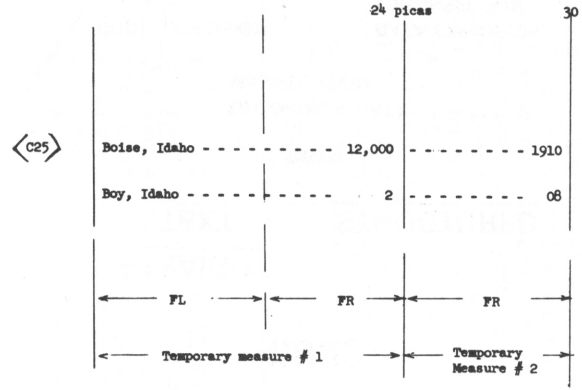
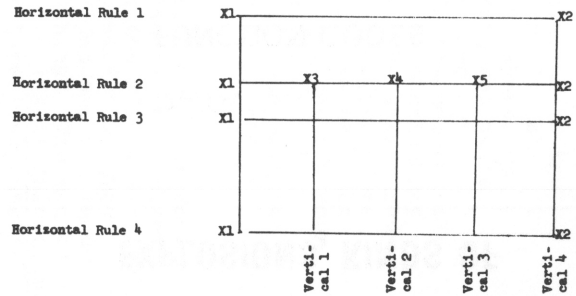
TYPOGRAPHIC PARAMETERS





COMPOSITION SYSTEM WORK SESSION NO. 2
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ENTRIES IN TYPOGRAPHIC PARAMETER TABLE *

	Units **	C1	C2	C3	C4	C5	C6
Measure	Picas	24	24	24	24	24	24
Face	Code Table	5	5	5	6	5	9
Size	Points	10	24	8	8	8	10
Indention) Primary (1st line)	Points	0	0	0	0	0	10
Indention) Secondary	Points	0	0	0	0	0	0
Word Space Max.	Points	5	8	4	4	4	6
Word Space Min.	Points	5	8	4	4	4	4
Line Mode	Code	FL	FL	FL	FL	FL	HJ
Pre-Text Space	Points	20	38	28	9	14	28
Baseline to baseline within the class	Points	10	28	9	9	9	11

* Assume Lead and Cast

** Could be picas, inches, points, mm, etc.

EXPLOSIONS, KINDS OF

DATA

FUNCTION CODES

RUNS

STRAIGHT

TEXT STRUCTURED

BOTH

EDITORIAL & DATA MANIPULATION

CODE EXPLOSION

DATA EXPLOSION
EDIT INSERTION

BOTH

COMPOSITION/COMPUTER

COMPOSITION/PHOTO

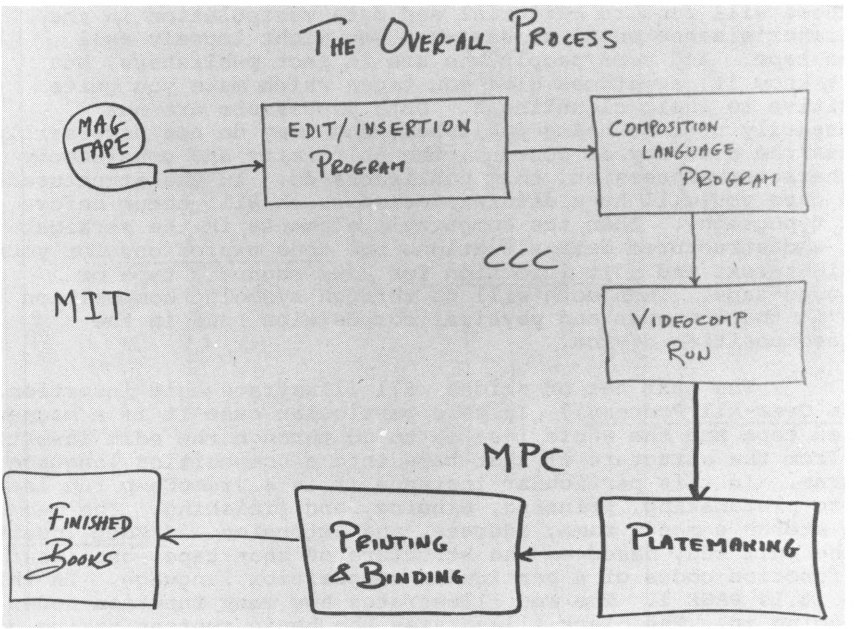
of these will require editorial and data manipulation in the publisher's sense until he has what you might loosely call clean tape. And some people who are in fact publishers, but don't know it, sometimes give you tapes which make you quite sensitive to their cleanliness. Data processors are not necessarily used to being publishers and they do not necessarily stress the accuracy of content, the uniformity and consistency of character expression, that publishers do. In the structured-data case you will have data explosion which will occur before your typography. Then the comparable elements in the straight-text and structured-data situations are code explosions for your straight-text and edit insertion for your magnetic tape or exploded tape. Then both will go through symbolic composition runs in the computer and physical composition runs in the photocomposition device.

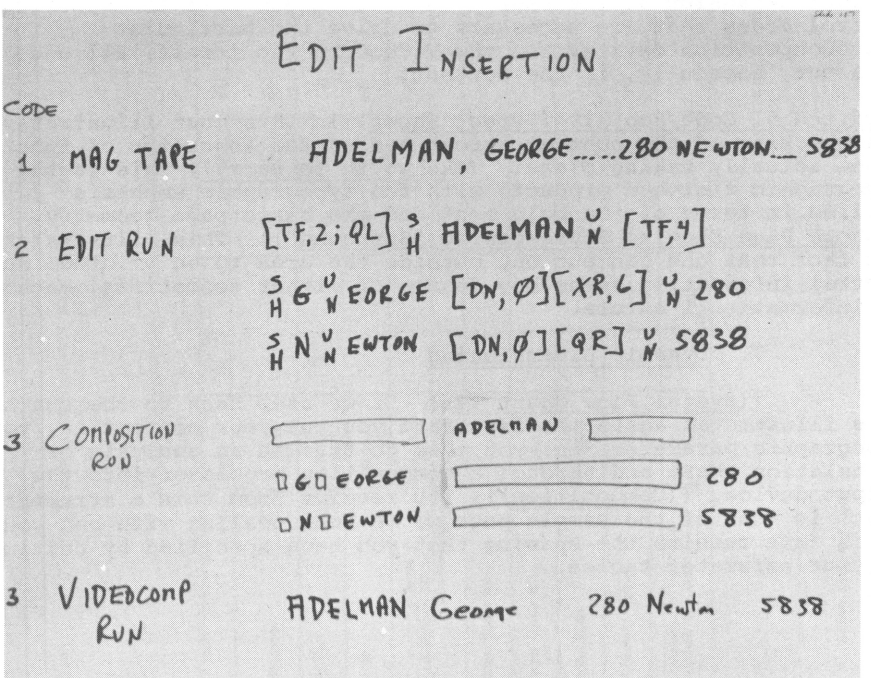
The next set of slides will illustrate edit insertion. ((The Over-All Process)) In this particular case it is a magnetic-stored tape and the whole idea is to go through the edit insertion run from the structure of that tape into a composition language program. In this particular instance it is a VideoComp run leading to platemaking, printing, binding, and finishing. The magnetic tape stores a man's name, address, and extension. ((Edit Insertion)) In the edit run, based on the structure of that tape, one inserts the function codes of a particular composition language. In this case it is PAGE 1. The red illustrates how many function codes are going in. The black illustrates the basic content string of characters. The green in the third bank down illustrates the further expansion of the PAGE 1 function codes into the numerical control codes that are necessary to drive the particular photocomposition device. In the VideoComp run itself, all one gets out, hopefully, is the content.

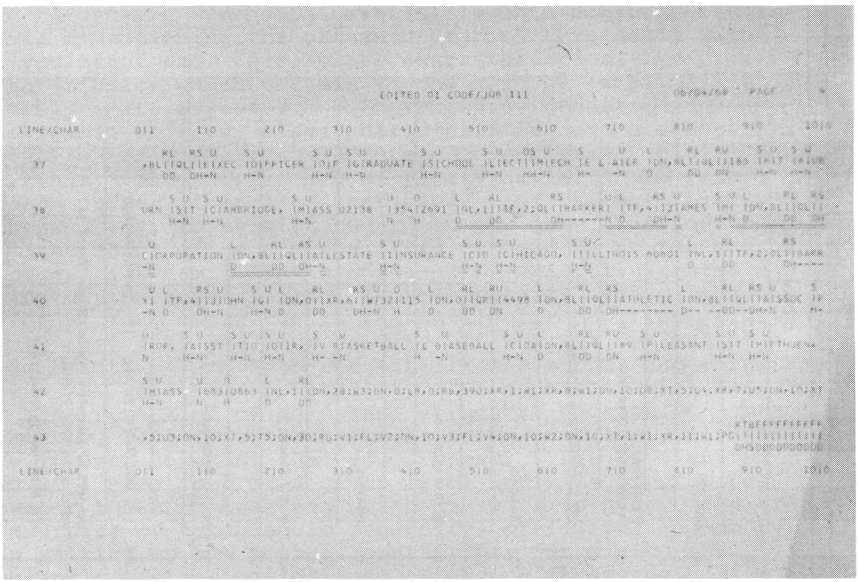
((Edited 01 Code/Job 111 (Corect Sheet))) This just illustrates the checking of the content stream and of the insertion of function codes actually taking place. ((Ashworth to Barry)) This is the typographic finished product, with the typographic emphasis applied in terms of the bold font and the basic page geometry. ((Whole Page Showing Housekeeping "Surround")) This illustrates the fact that one can put on, outside the area to be printed, such control information as he may desire of either geometrical nature or informational nature.

7. Dynamic Dimensioning

((System Flow Chart #4)) If we step back to the charts---- this illustrates again the fact that you put your content in, your typographic parameters in; you then go through an analysis or translation phase and through a composition processor into the output device. ((Composition)) You receive from this a structure which is that of the sample page we've been dealing with and you do in fact receive the spacing that you have specified by putting in your parameter tables.


THE OVER-ALL PROCESS
MAG TAPE
EDIT/ INSERTION PROGRAM
COMPOSITION LANGUAGE PROGRAM
CCC
MIT
VIDEOCOMP RUN
MPC
FINISHED BOOKS
PRINTING & BINDING
PLATEMAKING


EDIT INSERTION
CODE
1 MAG TAPE
ADELMAN, GEORGE....280 NEWTON__ 5838
2 EDIT RUN
[TF,2;QL] S H ADELMAN U N [TF,4]
S H G U N EORGE [DN,Ø][XR,6] U N 280
S H N U N EWTON [DN,Ø][QR] U N 5838
3 COMPOSITION RUN
ADELMAN
G EORGE
280
N EWTON
5838
3 VIDEOCOMP RUN
ADELMAN Geome 280 Newtm 5838



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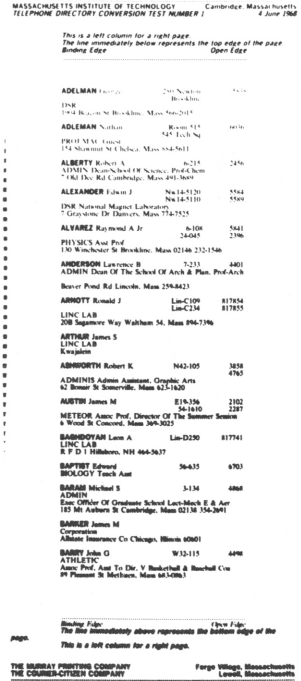

COMPOSITION SYSTEM WORK SYSTEM NO. 2
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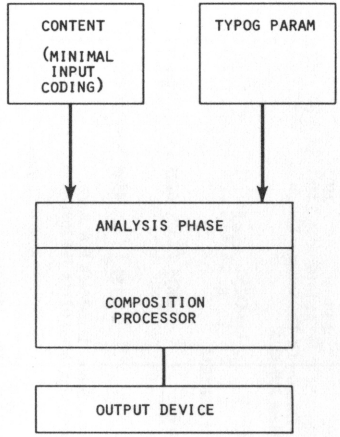
SYSTEM FLOW CHART #4



COMPOSITION SYSTEM WORK SESSION NO. 2
W. W. TUNNICLIFFE, CHAIRMAN

COMPOSITION

		10	20
C1	CHAPTER 1	10	
	(Problems)		38
C2	Introductory Session	24	
		4 24	28
	(of Computerized Typesetting)		
			28
C3	Chairman	8	
		1	9
C4	Mr G S Allen	8	
		6	14
C5	Speakers	8	
		1	9
C4	(Mr C J Duncan	8	
		1	9
	(Dr D G B Edwards	8	
		18	28
C6	CHAIRMAN: We are	10	about to hear

subject of Computer Typesetting. There is
working in this field.

Why Computer Typesetting?

Mr. C. J. Duncan (New Castle University): I
task this morning with considerable

((Dynamic Dimensioning--1)) In this approach of dynamic dimensioning the parameter tables have dealt with what you might call *intra*-class characteristics, the characteristics which pertain to one kind of text. It is basically *width-oriented*. With regard to conditional logic these relate to *inter*-class characteristics and are more *depth-oriented* geometry. There are housekeeping requirements of 2 kinds. The rudimentary of right-and left-hand pages, the page number, things of that kind. And the more involved, which are, say, rules with regard to how many lines of body text must occur after a given class of heading at the end of the page. ((Dynamic Dimensioning--2)) This illustrates the running of the dimensioning, in the sense of each of these classes of text occurring in its particular position, filling, and the fact that you must specify minimum and optimum page ending points----and that the more latitude that you structure in here the less your probability of a page-hang will be. You must have some kind of an escape structure because you cannot, presumably, anticipate each single occurrence that will take place in each document that you process. This is a system which will start out at a given level and will grow as you encounter the circumstances which cause it to hang. The area for exercise of typographic ingenuity, of logical ingenuity, is in setting up the logical constraints for giving the typographic expression latitude or giving it escape. It will take some creative expression.

8. Conditional Logic

((Conditional Logic--1)) If we look at conditional logic, the levels of specification and application will be, as just suggested, in part by the publisher or customer and in part by the publisher's manufacturer. The publisher's manufacturer must get into this right down to the nuts and bolts level. The publisher may or may not. The publisher can specify in broad or narrow terms and then let the printer execute the given desires. If a particular question comes up, an expression of stylistic choice can be obtained from the publisher. ((Conditional Logic--2)) The purpose of the conditional logic is to *establish flexibility within a regimented page geometry* so that you will not hang every time you would if you did this strictly by the numbers that you have specified in the parameter table, which is the more likely circumstance. It is *permissiveness in terms of typographic expression and in terms of logical expression*. It will allow you to finish the "book-pass".

((Conditional Logic - Illustrative Example 1)) Illustrative examples of conditional logic in simplified form are shown in these next 2 charts. Take the directory page that we put together in the sequential series of slides. An ad "call" might occur in the midst of a run of individual directory listings. It might start at a point where its specified length is going to exceed the depth allowed for the page. So one of the *conditional logic features*,the IF statements that you must put down, implicitly or explicitly, independent of any computer program is *what to do*. These features must be specified from the point of view of the user. If such and

DYNAMIC DIMENSIONING

PARAMETER TABLES

INTRA-CLASS CHARACTERISTICS
WIDTH-ORIENTED GEOMETRY

CONDITIONAL LOGIC

INTER-CLASS CHARACTERISTICS
DEPTH-ORIENTED GEOMETRY

PLUS HOUSEKEEPING

GRAPHIC COMMUNICATIONS Computer ASSOCIATION of PRINTING INDUSTRIES OF AMERICA, INC.

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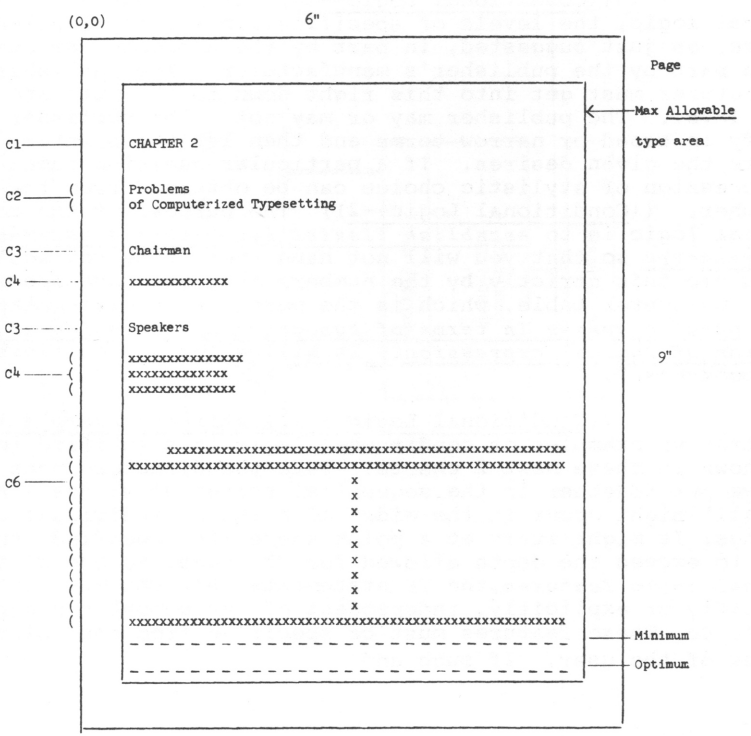
DYNAMIC DIMENSIONING


(0,0)
6"
Page
Max Allowable
type area
9"
C1
C2
C3
C4
C3
C4
C6
CHAPTER 2
Problems
of Computerized Typesetting
Chairman
xxxxxxxxxxxx
Speakers
xxxxxxxxxxxxxxx
xxxxxxxxxxxxx
xxxxxxxxxxxxxx
xxxxxxxxxxxxxx

CONDITIONAL LOGIC 1

LEVELS OF:

SPECIFICATION

APPLICATION

CONDITIONAL LOGIC 2

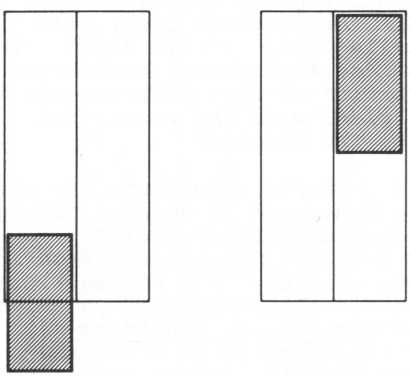
FLEXIBILITY

WITHIN A
REGIMENTED PAGE GEOMETRY

PERMISSIVENESS

TYPOGRAPHICAL EXPRESSION
WITHIN A
LOGICAL STRUCTURE

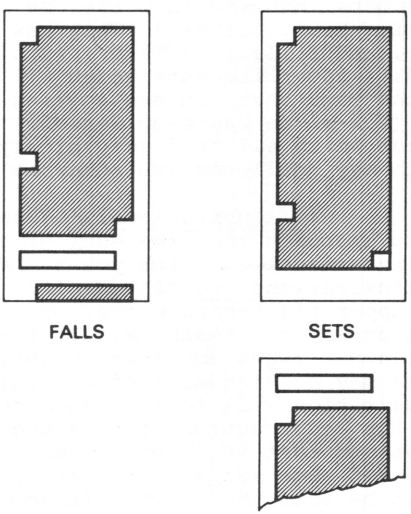
CONDITIONAL LOGIC
... ILLUSTRATIVE EXAMPLE



AS IT FALLS

AS IT IS SET

CONDITIONAL LOGIC
... ILLUSTRATIVE EXAMPLE



FALLS

SETS

such happened, I should. Or I would like. Or you may. So, in this example, the ad is spilled to the top of the next column and of course this means that the entries that came immediately after the "call" must be sloshed around to go before it. You must put it at the head and then fill in with the subsequent entries. In most utilitarian documents this won't matter. In some documents a publisher may not like this because there is ad income that relates to the intellectual callout from the directory listing to a particular ad. And that poses a different kind of condition. ((Conditional Logic--Illustrative Example 2)) The next chart illustrates, with regard to straight-text and the capability existent in some of these programs of elasticity in the vertical dimensioning, a case where the running text has come along; there is a heading illustrated in red; and there would be one line of text after this. And the publisher has said, "Completely verboten." The conditional-logic circumstance would be keeping track, so to speak, as you went down. It would know that you only had one line of text after that class of heading and the page had ended. The correction could take the form of throwing that heading to the next logical page and of expanding the leading in the running text as one obvious thing that people might do, but it might not be preferable from the point of view of the publisher. If you wanted to keep uniform spacing, uniform leading, within the body, you would look for areas of white space that it was allowable to change, such as the white space around a heading, preceding and following a heading, if that page had headings in it prior to this time. These are intended to illustrate kinds of logical solutions that you might put into this approach----coarse, to be sure, but intended to be illustrative.

((Full Page)) Witness another drug directory page, somewhat more involved than the one that you have seen. ((Running Heads, Running Feet, Filler)) This has the usual running heads, running feet, and filler; ((Text)) running directory listing copy; and ((Ads)) advertisements which will be called out. ((Full Page)) This is the page that you are seeking from these fundamental constituents and ((12-slide Paste-up Series)) the "build" of that page----with 12 pieces which all fall very nicely into place with the razor, but which may challenge you somewhat more in the machine!

((Illustrations)) These next 3 charts illustrate how one might approach the treatment of cuts on pages and in essence create a circumstance in which you can exercise *preferential logic*. ((Illustrations, continued--1)) Maybe you want the illustration in the upper right-hand corner of the page, if there is a single illustration as in a textbook. If there are two illustrations, you might want upper right and lower right. ((Illustrations, continued--2)) There may be standards of a particular publisher as to where the illustration will fall. These pose more complex logical requirements for the construction of this page by machine. And I think one should point out that it is not to be expected that there will not be required some *man/machine interrelationship*. The optimum, of course, would be that third CRT. If you consider the first one to be the soft input, the second one to be the CRT output to the photographic medium, the third one is the live, real-time man/machine interrelationship where you do page design on the computer----a la General Motors body design. And it is important to realize that the intermediate

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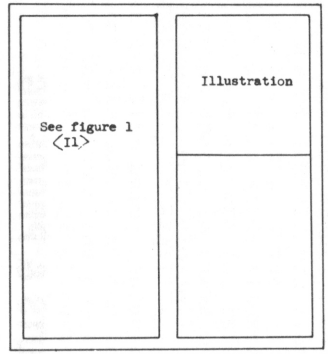
ILLUSTRATION ⟨In⟩

Preferential Logic: Illustration specifications take preference over text specifications

Examples:

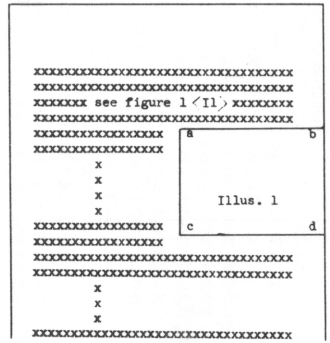
ONE: When ⟨I1⟩ appears, put illustration in upper right corner of page (Pre-established position, recomposition may be required)



TWO: Finish line in which ⟨I1⟩ appears, add one more line, then change measure of text for Y_1 duration

X_1 = X for I1

Y_1 = Y for I1



COMPOSITION SYSTEM WORK SESSION NO. 2
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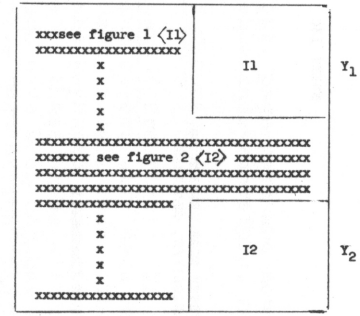
ILLUSTRATIONS (Continued)

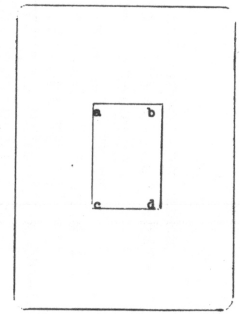
Preferential Logic Examples:

THREE: When a second ⟨In⟩ appears on one page, put second illustration in lower right corner



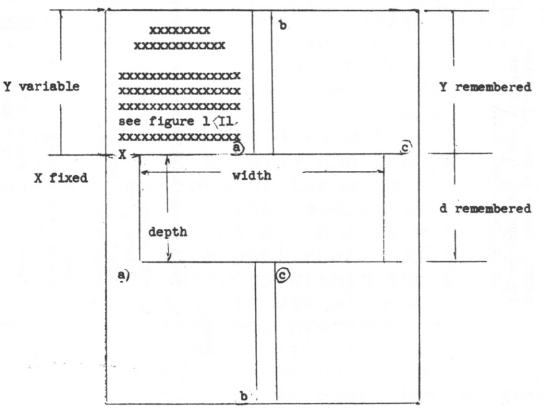
NOTES:

1. Table characteristics of each illustration
2. Wrap around:
   Relate origin (a, b, c, d) to page layout
3. Class 1 - words
   Class 2 - occasional illustrations
   Class 3 - multiplicity of illustrations



COMPOSITION SYSTEM WORK SESSION NO. 2
W. W. TUNNICLIFFE, CHAIRMAN

ILLUSTRATIONS (Continued)



Specified in Il :

X

Width

Depth

INPUTS & PROOFING

DATA
FLAGS

EMERGING
TECHNIQUES

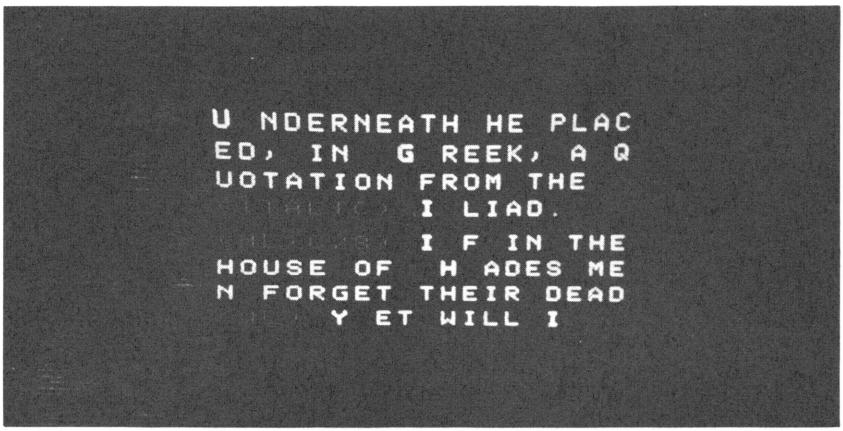
solution----a first page-pass and non-real-time fix----is more economically viable and, therefore, more imperative.

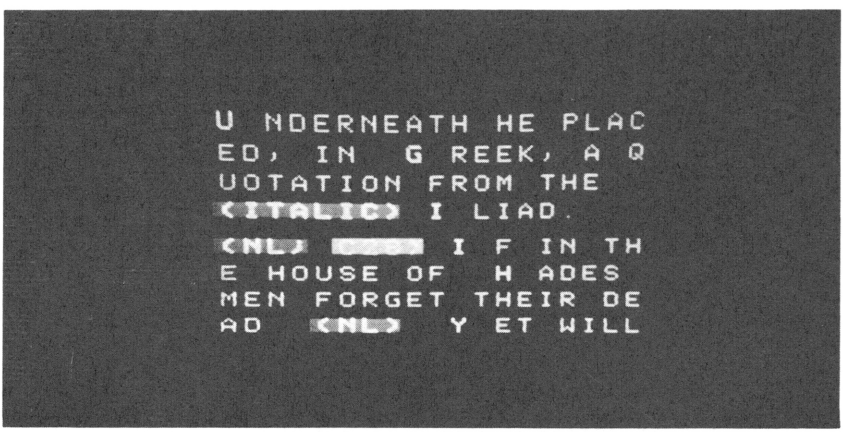
D. Input Techniques

((Inputs & Proofing)) In the input and proofing area we've talked about essentially data and flag identifiers, by whatever names you want to call them. There are some emerging techniques and the keyboard area itself is probably the most exercised of any of these areas within, say, the last 18 months in particular. There have been changes since the ((Input Text)) "Energetic Particle Observation" that appeared in the PENROSE ANNUAL in 1968 where this is the input text, ((Input Corrections)) this illustrates corrections only, as against total reset, ((Page Image)) leading to the finished page.

((7 of Fortune's top 10 companies have one thing in common. They all have better keyboard operators than you.--KTI)) Some of the countless new techniques are in education, but the main thrust of the new techniques is not simply a better keyboarding rate. ((We're out to put keypunches in their place)) Witness growing applications of minicomputer and timesharing input/editing subsystems----capable of geographic separation from the composition computer and the associated photocomposition device. *This is a factor to be considered seriously in the selection of an over-all system concept.*

((Viatron Color-CRT Keyboard Series I: 1 segment, spread apart)) Witness the possibilities of soft input----and the implicit language requirement, and opportunity, which they pose....as illustrated by the use of GENERIC function codes embedded in this synthesized example of a little Greek. ((2 segments; top, closed; bottom, spread apart)) This slide illustrates two 80-character lines where the first one appears for reference and the one currently being entered is spread apart, in terms of line separation, for ease in reading. ((2 segments, both closed)) This slide shows them both closed; ((2 segments, both closed)) this illustrates line advance ----with the first top line being replaced by the first bottom line and the first bottom line moving to the top-line position and the new line going into the bottom-line position, thus affording continuity of reference for original keyboarding or proofreading. ((2 segments, both closed)) Another line advance. ((Viatron Color-CRT Keyboard Series II: 1 segment)) This illustrates an alternate form of display encoding, another illustration of a keying variant offering backlighting as a means of emphasizing function codes ((2 segments, both closed))----perhaps for ease in proofreading separation of content and function code, or, more precisely, in the context of our present concern, MODE identifiers. Note that this approach allows of *joint or separate proofing for intellectual and typographic purpose.* ((2 segments, both closed)) Illustrating line advance ((2 segments, both closed)) and line advance again ((Underneath be placed, in Greek....)) leading, via the inevitable program, to the finished product.





Underneath he placed, in Greek, a quotation from the *Iliad.*

If in the house of Hades men forget their dead
Yet will I even there remember you, dear companion.

The most deeply felt dream of Jefferson's life was over. He, like all men, needed a personal vision to give order and direction to his life. Could he now find one to replace what he had lost? Wandering the Albemarle hills, he simply did not know. It would take almost a decade for him to realize that the words he had written in Phil-

E. Software and Standardization

((Great Moments in Data Preparation)) Where are the great moments in data preparation? ((Software)) They are, as you ladies and gentlemen know better than most, in the software! It is, in relative terms, useless to keyboard for computerized composition or, for that matter, for any purpose, if you do not have an input plan related, or relatable, to the software. ((Garbage it's not)) This is a matter far beyond the all-too-familiar GIGO -- or, to introduce a commercial note -- the issue of whose garbage it is when it turns out that way!

((World Map)) If we touch on standards for a moment, this illustrates the metric countries and those which are going metric. The red indicates those which are non-metric. As you can see, at least on an area basis, it seems to be confined largely to the United States and Canada, with some suggestion that they might change their minds. ((Life would be a lot easier if we standardized)) Of course, as in marketing, it depends on how you wrap the product. Standardization can be sold in many different ways. This is the method of the Metric Association. ((Standardized Languages Offer No Benefits to Users)) There are those who have different views about standardization in computer languages and programming languages as you can see from this illustration from ComputerWorld. But it often has to do with environment, ((Cartoon: But will he listen to your troubles?)) and a computer will not, or standards will not, necessarily listen to your troubles.

((Standardization)) Standardization has been much discussed from the point of hole or tape codes, but the things that you will find more to your need are the methodology, the structure, and the meaning. If you want a hanging indent, you want that to mean that and that only with a specified parameter. You do not want ambiguity of meaning. If one looks at printed documents and looks at the intellectual hierarchy of the document, one will often find that, from a typographic point of view, in the same book a given hierarchical level, e.g., a given heading class, may be treated differently in different portions of the book because it happened to be set on different days by different people or the copy had been provided at different times. But this system is based on the logical treatment of everything of a given class in the same identical way, subject to a set of conditions and a set of parameters, which are yours to select.

((The art of progress is to preserve order amid change and to preserve change amid order)) As to system interfaces, one cuts the cable where the wire count is lowest, or most advantageours. Establishing the interface at the INPUT zone would be most advantageour. AND it would establish interfaces appropriate to the establishment of proprietary-rights jurisdictions, which one detects from the handouts to be an issue.

STANDARDIZATION

The factors which are standardized are:

METHODOLOGY

STRUCTURE

MEANING

NOT particular machine code

THE CARE, FEEDING, AND IDENTIFICATION OF

SPONSORS -- CONTRIBUTORS

BIG DADDY THEORY
STANDARDS ORGANIZATIONS
GROUP THINK X GROUP
INDIVIDUAL EXPRESSION

COST DECISIONS

HARDWARE
SOFTWARE
PEOPLEWARE
OTHERWARE
TURMOILWEAR

J.P. MORGAN'S FRIEND

OLD EGYPTIAN SAYING

WHO WILL LISTEN?

WHO WILL TALK??

CAPABILITY

FULL
PARTIAL

IN-HOUSE
OUT-OF-HOUSE

VI. SPONSORS

((The Care, Feeding and Identification of Sponsors/Contributors)) In the care, feeding, and identification of sponsors and contributors there is the Big Daddy Theory which went right out the window, and more particularly so in recent months. There are the standards organizations, the most active of which is represented by Dr. Duncan here today. There is group-think, as expressed by the members of any cooperative endeavour and there is the area of individual expression, which might be spelled family because it all comes down to time.

((There'll Be Less Leisure Than You Think)) There must also be a state of mind; there will, indeed, be less leisure than you think. ((Everyone told the ram)) And there must be conscious intent----Everyone told the ram, "You can't...punch a hole in that dam," but the really small print says, "They forgot that determination often makes an impossible dream come true."

VII. COSTS

((Cost Decisions)) In the matter of cost decisions one can take out his handy-dandy character generation notebook which GCCA has published on CRT's. One can look at sample pages, find out the run times. These are the pages which Mr. Lannon used in his document, and one can look at the results of Mr.Lannon's work. One can talk with manufacturers and get costs. He can create circumstances of estimation which apply to his particular environment. He will include factors for hardware, software, peopleware, the other ware that we have talked about. The one thing that we haven't mentioned at all is that he better be prepared for a little turmoilwear. And this one is spelled slightly differently - and recently has been termed EMOTIONAL cost. And depending on the appetite that he has created for himself, in terms of capability, whether he wants full or partial capability, whether he wants to have the work all in-house under his control or whether he wants to allow of some being done outside his firm, he might do well to bear in mind (if he considers full capability) the response given J.P.Morgan's friend when he inquired about how much does it cost to have a yacht. You all know the answer: If you have to ask the question, you can't afford one.

((Egyptian tablet)) There is that old Egyptian saying, carefully carved on a stone tablet, that there is no such thing as a free lunch. Nobody is going to do this job for free, quickly, immediately, and hand it to anybody in this room on a silver platter, although I would love to be challenged, love to be told that I'm wrong. The basic question is not only who will listen, although that's easier to determine, but also who will talk. There are those who are practitioners and I sometimes think that, with certain notable exceptions, those who are the most successful talk the least. And it remains for those of us who are conjecturalists in the field of computerized composition, who have no operating establishment, no vested interest, no proprietary right, to talk. But somewhere in this group there must be action of that kind if this is to proceed.

((Make no Little Plans)) As regards financial magnitude one should make no little plans, ((If you need a fast, objective analysis)) nor plan on any quick triumphs, for, if you need a fast, objective analysis, and, ((THINK AGAIN!)) if the past has been a guide, one must, indeed, think again. ((Attention to even the smallest detail makes the DIFFERENCE)) As it is in the racing business, attention to detail is the only solution to that particular problem, and the detail is enormous.

VIII. ROLES AND GOALS

((CREE SQUAWS ARE AMONG THE WORLD'S BEST FEATHERPLUCKERS)) But each of us may find his place in this wild world of bits and bytes. Some of us are chicken pluckers; some of us are information processors; some of us are computer programmers; some of us are printers. But there is a role for everyone in putting this system together. ((WHEREVER A MAN GOES, THERE IS A GREEN MOUNTAIN"--A Japanese Proverb)) One must retain the spirit of optimism which runs through this old Japanese proverb, and, as you will have noticed, the mountains can be white as well as green.

((AT&T: Reach out for someone. To communicate is the Beginning of Understanding)) If we can shift to a montage paraphrase, in which Mother Bell encourages us not only to use her facilities but I think also, in our own orbital paths, to try and communicate to develop a system which will meet the needs of the publishers and the publisher's manufacturers together. ((The Not-so-Brief Case)) It will take concerted, cooperative effort to develop this not-so-brief case. ((ONE MAN'S VISION, MANY MEN'S SKILLS)) To follow Premier Smallwood's example, and persistence, in making Churchill Falls a reality -- now most urgently needed.

((Benard Cell Cloud Formation)) In our own chosen Labrador, the air may be rarified, the scenery beautiful, ((STOP: THE AREA AHEAD HAS THE WORST WEATHER IN AMERICA. MANY HAVE DIED THERE FROM EXPOSURE, EVEN IN THE SUMMER. TURN BACK NOW IF THE WEATHER IS BAD.)) the terrain dangerous, but shall we be dissuaded? or prepared?

((GOAL)) The goal is simply stated: DEFINE AND DEVELOP AN INPUT LANGUAGE OF IDENTIFICATION AND SPECIFICATION.

IX. ACKNOWLEDGMENTS

((Report from Ottawa)) It is a pleasure to acknowledge the contributions of those who have participated in the conceptual extensions of the original contribution to the Canadian Centennial, presented at a Character Generation Committee meeting in Ottawa/Hull in September 1967. The concepts were discussed and expanded in work sessions in Washington/Bethesda in July, August and September 1968. They have subsequently been described at Las Vegas in November 1968 and in New Orleans in November 1969. These meetings have all been held under the auspices of the Graphic Communications Computer Association (then the Computer Section), a section of the Printing Industries of America which has consistently provided significant support to these considerations.

((That Old Gang of Mine)) ((Contributing Organizations)) Contributing organizations are listed in the slide, and direct recognition should be given to those participants in attendance at this meeting: Norman Scharpf, Roger Schubert, John Seybold, Bernard Taymans, and Tommy Tompkins. The contributions of all are sincerely appreciated, and the responsibilities are, of course, those of the author----with the conventional disclaimer that the material presented does not represent the views or position of any of the Government agencies, associations, or commercial organizations listed.

X. EPILOGUE

((Where do you go from here? The sky's the limit.)) As to course, where would you like to go from here? It is suggested that it will take ((idea power)) the application of idea power, and, ((Motivated Men Made America Great)) one should remember, a certain degree of motivation.

((Figure at Microphone....Harangue)) By a combination of what, hopefully, has been a compatible mixture of aural and visual imagery, I have tried to portray what a USER might desire from whatever system might be created for the publisher's manufacturer ....not so much by discussion of technical detail, but rather more by the *imagery of conceptual outline* of a possible system....not in deathless prose but in a montage of audio-visual one-liners, with an occasional chart of detail. IF it has provoked your thought, if it has stimulated thoughts concerning imaginative application of software, imaginative development of economically viable and organizationally tractable business systems....then *THIS communication form will have served its intended purpose.*

CANADA	UNITED STATES
GOVERNMENTAL	
Government Printing Bureau	Government Printing Office Defense Supply Agency National Bureau of Standards National Institutes of Health
PRIVATE SECTOR	
Southam Printing Co.	The William Byrd Press, Inc. Courier-Citizen Co. Corley Printing Co. Herbick & Held Printing Co. Phillips & Van Orden Div. Radnor Graphic Arts, Inc. Rocappi, Inc.
COMPUTER MANUFACTURERS	
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